AMENDMENTS TO THE CLAIMS

Please amend claims 69, 77, 78, 81 and 88. Please add new claims 96-99.

1. – 45. (Cancelled)

46. (Previously Presented) A method for obtaining information about a subject, comprising the steps of:

providing a magnetic resonance scanner;

providing an atlas having magnetic resonance data including tissue type prior probability derived from at least one other subject;

processing information received from said scanner pertaining to said subject;

reading said atlas; and

determining alignment of said magnetic resonance scan to obtain a specific geometry of a subsequent magnetic resonance scan.

47. (Original) The method of claim 46, further comprising the steps of:

communicating alignment data from said processor to said scanner; and

automatically aligning said magnetic resonance scan to obtain said specific geometry of a subsequent magnetic resonance scan by the use of said alignment data.

48. (Original) The method of claim 46, wherein said step of providing an atlas having magnetic property values derived from at least one other subject involves data derived from a plurality of subjects.

49. (Cancelled)

50. (Previously Presented) A method of using a processor for obtaining information about a subject, comprising the steps of:

providing magnetic property values from a scanner pertaining to said subject;

providing an atlas having at least two magnetic property values for at least one corresponding voxel derived from at least one other subject; and

labeling by said processor of tissue types of a tissue corresponding to said magnetic resonance property values pertaining to said subject by the use of said atlas having said magnetic resonance values derived from at least one other subject.

51. (Original) The method of claim 50, wherein said step of providing an atlas having magnetic property values derived from at least one other subject involves data derived from a plurality of other subjects.

52. (Previously Presented) A method for creating an atlas, comprising the steps of:

providing a first magnetic resonance modality volume pertaining to a subject and divided into voxels;

correcting distortion of said first magnetic resonance modality volume; and

recording a magnetic property value in a node of said atlas corresponding to a voxel of said first magnetic modality volume.

53. (Cancelled)

54. (Original) The method of claim 52, further comprising the steps of:

providing a second magnetic resonance modality volume pertaining to a second subject and divided into voxels;

correcting distortion of said second magnetic resonance modality volume; and

updating said magnetic property data in said node of said atlas corresponding to a voxel of said second magnetic resonance modality volume.

55. (Original) The method of claim 52, wherein the step of correcting involves the correction of distortion caused by at least one of the group consisting of chemical shift, magnetic susceptibility, per-acquisition motion, gradients non-linearity, main magnetic field non-homogeneity, eddy currents, and Maxwell effects.

56. (Original) The method of claim 52, further comprising the steps of:

providing a plurality of magnetic resonance modality volumes pertaining to a plurality of subjects and each of said plurality of magnetic resonance modality volumes divided into voxels;

correcting distortion of each of said plurality of magnetic resonance modality volumes; and

updating said magnetic property value in said node of said atlas corresponding to a voxel of each of said plurality of magnetic resonance modality volumes;

wherein said magnetic property value in said node of said atlas includes statistical data.

57. (Original) A method for creating an atlas, comprising the steps of:

providing a first magnetic resonance modality volume pertaining to a subject and divided into voxels;

providing a labeled volume indicating tissue types of tissue corresponding to said voxels;

correcting distortion of said first magnetic resonance modality volume;

extracting magnetic property distribution parameters for each tissue type identified at each voxel; and

recording magnetic property data corresponding to each tissue type in a node of said atlas corresponding to a voxel of said first magnetic resonance modality volume.

58. (Original) The method of claim 57, further comprising the steps of:

providing a plurality of magnetic resonance modality volumes pertaining to a plurality of subjects and each of said plurality of magnetic resonance modality volumes divided into voxels;

providing a plurality of labeled volumes corresponding to said plurality of magnetic resonance modality volumes and indicating tissue types of tissue corresponding to said voxels;

correcting distortion of each of said plurality of magnetic resonance modality volumes; and

updating said magnetic property data in said node of said atlas corresponding to a voxel of each of said plurality of magnetic resonance modality volumes.

59. – 68. (Cancelled)

69. (Currently Amended) An atlas ~~implemented in software~~ embodied on a computer-readable medium comprising:

a plurality of nodes corresponding to a plurality of voxels representing spatial locations of a subject, each of said nodes configured to store at least two magnetic property values for each of said voxels as determined by magnetic resonance imaging.

70. (Previously Presented) The atlas of claim 69 in which the plurality of nodes represent the subject divided in three-dimensional space.

71. (Previously Presented) The atlas of claim 69 in which one of said nodes corresponds to one of said voxels.

72. (Previously Presented) The atlas of claim 69 in which said magnetic property values include T1 and T2 values.

73. (Previously Presented) The atlas of claim 72 in which said magnetic property values also include a proton density value.

74. (Previously Presented) The atlas of claim 69 in which said at least two magnetic property values represent different magnetic properties.

75. (Previously Presented) The atlas of claim 69 in which said magnetic property values correspond to a tissue type at one or more voxels.

76. (Previously Presented) The atlas of claim 69 in which said magnetic property values correspond to a first tissue type at one voxel and a second tissue type at a second voxel.

77. (Currently Amended) An atlas ~~implemented in software~~ embodied on a computer-readable medium compromising:

a plurality of nodes corresponding to a plurality of voxels representing spatial locations of a subject, each of said nodes configured to store at least one magnetic property value as determined by magnetic resonance imaging and at least one tissue type prior probability value corresponding to a tissue type of a voxel.

78. (Currently Amended) An atlas ~~implemented in software~~ embodied on a computer-readable medium comprising:

a plurality of nodes each configured to store values of a statistical representation of at least one magnetic property value as determined by magnetic resonance imaging and a statistical representation of at least one tissue type prior probability value corresponding to a tissue type for each of a plurality of corresponding voxels of a plurality of subjects.

79. (Previously Presented) The atlas of claim 78 in which said statistical representation values include a mean and a variance of intensities of each of a plurality of magnetic property values at each corresponding voxel of said plurality of subjects.

80. (Previously Presented) The atlas of claim 79 in which said mean and variance are determined for each tissue type.

81. (Currently Amended) An atlas ~~implemented in software~~ embodied on a computer-readable medium comprising:

a plurality of nodes each configured to store values of a statistical representation of at least two magnetic property values as determined by magnetic resonance imaging for each of a plurality of corresponding voxels of a plurality of subjects.

82. (Previously Presented) The atlas of claim 81 in which said statistical representation values include a mean and a variance of intensities of each of a plurality of magnetic property values at each corresponding voxel of said plurality of subjects.

83. (Previously Presented) The atlas of claim 81 further including at least one tissue type prior probability value corresponding to a tissue type for each of a plurality of corresponding voxels of a plurality of subjects.

84. (Previously Presented) The atlas of claim 83 in which, for each of said tissue types, said mean and said variance of said magnetic property values at said spatial locations are determined.

85. (Previously Presented) The atlas of claim 81 in which said values of a statistical representation are scanner-specific.

86. (Previously Presented) The atlas of claim 81 in which said values of a statistical representation are acquisition-specific.

87. (Previously Presented) The atlas of claim 81, wherein said values of a statistical representation contain magnetic resonance sequence parameters, including at least one from the group consisting of TR, TE and flip angle.

88. (Currently Amended) An atlas ~~implemented in software~~ embodied on a computer-readable medium comprising:

a plurality of nodes corresponding to a plurality of voxels of at least one subject;

at least one node of said plurality of nodes configured to store a prior probability of a tissue type located at said voxel corresponding to said node and a statistical value of a magnetic property value of said tissue type located at said voxel corresponding to said node.

89. (Previously Presented) The atlas of claim 88, in which in said statistical value comprises mean and variance.

90. (Previously Presented) The atlas of claim 89 in which said voxels correspond to a plurality of subjects and a plurality of tissue types are located at said node and said statistical value is comprised of a plurality of statistical values calculated for each of said tissue types located at said voxel corresponding to said node.

91. (Previously Presented) The atlas of claim 88 in which said voxels correspond to a plurality of subjects and a plurality of tissue types are located at said node and said statistical value is comprised of a plurality of statistical values calculated for each of said tissue types located at said voxel corresponding to said node.

92. (Previously Presented) A system for obtaining information about a subject, the system comprising:

a magnetic resonance scanner configured to obtain a magnetic resonance scan of said subject;

an atlas including:

a plurality of nodes corresponding to a plurality of voxels representing spatial locations of a subject, each of said nodes configured to store at least two magnetic property values for each of said voxels as determined by magnetic resonance imaging, or at least one magnetic property value as determined by magnetic resonance imaging at least one tissue type prior probability value corresponding to a tissue type of a voxel; and

a processor adapted to receive information from said scanner pertaining to said magnetic resonance scan and to read said atlas.

93. (Previously Presented) A method for obtaining information about a subject, comprising the steps of:

providing a magnetic resonance scanner;

providing an atlas having magnetic resonance data including more than one magnetic property value prior probability derived from at least one other subject;

processing information received from said scanner pertaining to said subject;

reading said atlas; and

determining alignment of said magnetic resonance scan to obtain a specific geometry of a subsequent magnetic resonance scan.

94. (Previously Presented) The method of claim 93 further comprising the steps of:

communicating alignment data from said processor to said scanner; and automatically aligning said magnetic resonance scan to obtain said specific geometry of a subsequent magnetic resonance scan by the use of said alignment date.

95. (Previously Presented) The method of claim 93, wherein said step of providing an atlas having magnetic property values derived from at least one other subject involves data derived from a plurality of subjects.

96. (New) A method of aligning and/or segmenting an MR scan, the method comprising:

constructing an atlas from prior MR scans of subjects to include nodes each including: tissue type probability information, at least one magnetic property value, and location information;

scanning a subject with an MR scanner to produce a magnetic resonance image;

interfacing the magnetic resonance image with the atlas and the tissue type probability information, magnetic property values, and location information thereof to determine, from the scan, the probability of tissue type by location in the magnetic resonance image; and

aligning the MR scan and/or segmenting the MR scan.

97. (New) A method of aligning and/or segmenting MR scan, the method comprising:

constructing an atlas from at least three MR scans of other subjects which define node locations in anatomic atlas space which are independent of MR imaging platform voxel properties whereas voxels are dependent upon MR imaging instrument instructions and nodes are independent of MR imaging platform instructions, each node including probability information for at least four independent properties: location in three dimensional atomic atlas space, prior probability of specific tissue types at this nodal location, statistics of at least one magnetic resonance property assigned to specific tissue types at this nodal location, and prior probability of specific tissue types of neighboring nodes for each tissue type at this nodal location, wherein magnetic resonance property values include one or more parameters such as T_1 or T_2 for the identical nodal location in anatomic space;

scanning a subject with an MR scanner to produce a magnetic resonance image representative of that subject comprised of voxel volume elements constructed in accordance with MR imaging instrument instructions;

interfacing the magnetic resonance image with the *a priori* nodal information from the previously constructed atlas; and

aligning the MR scan and/or segmenting the MR scan to maximize the post probability of its voxel components matching both position in anatomic space and at least one MR tissue characteristic of the nodes determined *a priori* in the reference atlas.

98. (New) The method of claim 97 in which two MR scans are obtained at different points in time to develop data about changes in anatomic distribution of organ tissue

components and/or changes in their MR properties independent of imaging instrument instructions.

99. (New) A method of creating an *a priori* nodal atlas as a reference for the consistent alignment and/or segmentation of subsequent MR scans constructed from:

three or more MRI scans which are used to create a nodal atlas, each node containing information about location in three dimensional anatomic space, as well as information about magnetic resonance properties of each location in anatomic space for specific tissue types and prior probability for specific tissue types and prior probability of specific tissue types of neighboring nodes for each tissue type at the nodal location; and

achieving uniform MR scan alignment and/or scan segmentation of subsequent scans by operating on the voxel based images created in accordance with instructions of each imaging instrument and applying transformations which maximize the probability of matching each voxel to a corresponding node in a reference atlas.